

CURRICULUM VITAE ET STUDIORUM: PROF. CHIARA ZANARDI



Personal data: Born in S. Giovanni in Persiceto (BO), 16/07/1974

Present Position: Associate Professor

Address: Via G. Campi 103, 41125, Modena. Phone: +39 059 2058650

Email: chiara.zanardi@unimore.it

Web site: <https://www.elsens.unimore.it>

ResearchID: <http://www.researcherid.com/rid/F-6915-2016>

ORCID ID: orcid.org/0000-0002-2091-3398

EDUCATION

- **Oct 1998** Degree in Industrial Chemistry (110/110) at the University of Bologna with a thesis entitled 'Characterization of electrodes modified with the hydrotalcite [Ni/Al-Cl]. Proposal for the use as an amperometric sensor', under the supervision of Prof. R. Seeber
- **Jan 2002** Ph. D. in Chemistry at the University of Modena and Reggio Emilia with a thesis entitled 'Synthesis and electrosynthesis of oligo- and polythiophenes β -functionalised with alkylsulphanyl groups' under the supervision of Prof. R. Seeber

PREVIOUS POSITIONS AND FELLOSHIPS

- **From 1 Sep 2002 to 30 Oct 2015.** Researcher at the University of Modena and Reggio Emilia

VISITS AND STAYS

- **Sep 2003** Visiting scientist at the Dept. of Chemistry of the University of Turku (FIN);
- **Feb 2007** Visiting scientist at the Dept. of Chemistry of the University of Burgos (ES);
- **Sep 2010** Visiting scientist at the Dept. of Chemistry of the University of Burgos (ES);
- **Jul 2012** Visiting scientist at the Dept. of Analytical Chemistry of the University of Cadiz (ES)
- **Nov 2018** Visiting scientist at the School of Chemistry of the University of Lincoln (UK)

BRIEF DESCRIPTION OF THE RESEARCH ACTIVITY

The main research activities are in the field of electroanalysis. In particular, the final aim is the development of new sensors and biosensors for the quantification of meaningful analytes in foodstuffs, environmental matrices and biological fluids. This implies the development of electrode coatings based on innovative materials and suitable to give most valuable information on the matrix studied, with respect to the conventional electrode surfaces

The main materials studied are:

- conducting polymers
- redox polymers
- metal and metal oxide nanoparticles
- carbon-based nanomaterials (graphene oxide, carbon black and carbon nanotubes)

The main applications are:

- wearable sensors for the detection of biomarkers in biological fluids
- sensors for the definition of quality of foodstuffs and beverages
- sensors for drugs of abuse
- pollutants in wastewater

MAJOR COLLABORATIONS

- Dr. V. Palermo, Dr. M. Melucci and Dr. E. Treossi - Istituto per la Sintesi Organica e Fotoreattività (ISOF) del Consiglio Nazionale delle Ricerche (CNR), Bologna
- Prof. F. Arduini - Department of Chemical Science and Technologies, Università di Roma Tor Vergata
- Prof. A. Heras and Prof. A. Colina - Department of Chemistry, University of Burgos (Spain)
- Dr. Z. Xia - Department of Industrial and Materials Science, Chalmers University (SE)
- Prof. J. M. Palacios-Santander and M. L. Cubillana - Department of Analytical Chemistry, University of Cadiz (Spain)
- Prof. J. Lukkari - Department of Chemistry, University of Turku (Finland)
- Prof. S. Lupu - Universitate Polytechnica de Bucharest (Romania)
- Prof. M. Prato - Carbon Bionanotechnology laboratory, Centre for Cooperative Research in Biomaterials-CIC biomaGUNE – San Sebastian – Spain
- Prof. L. Mercolini - Department of Pharmacy and Biotechnology, University of Bologna
- Prof. A. Ulrici and Dr. G. Foca - Chimslab Research Group, Department of Life Sciences, University of Modena and Reggio Emilia
- Prof. F. Pellati - Department of Life Sciences, University of Modena and Reggio Emilia
- Prof. M. Licata - Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia.

FUNDING AND PROJECTS

- 2020-21: Galileo Program with the University of Strasburg (FR) 'Development of electrochemical sensors for the monitoring of human health' (PI Italiano)
- 2019-21: FAR2019 Interdisciplinary 'Novel analytical tools for the determination of cannabinoids in Cannabis sativa L. based products and biological fluids' (PI)
- 2018-19: FAR2017 'Development of silica-based amperometric sensors' (PI)
- 2017-onwards: "Graphene Flagship" within the Research Unit of ISOF-CNR
- 2018-20: Spearhead project 'Multifunctional plaster sensor for human skin, based on functionalized graphene - ChemSens' (Deputy Leader)
- 2016-17: FAR2015: 'Development of silicate-based materials for sensor applications'
- 2013-2014: Seed activity of Nanosystems, materials and emerging systems for sustainable technologies of the Università di Modena e Reggio Emilia 'Development of nanostructured materials for the amperometric sensing' (PI)
- 2010-11: PRIN2009 "Electrochemical sensors based on thin films of nanostructured functionalized materials" (PI: prof. R. Seeber - RU: Unimore)
- 2010-11: Collaborative European Project "Drugs And PreCURsor Sensing By ComplemenTing Low COst Multiple Techniques - CUSTOM" (PI: Selex Italia)
- 2007: Mobility actions within the scientific and cultural collaboration program of the University of Modena and Reggio Emilia with affiliated foreign universities. Outgoing to the University of Turku (Finland)
- 2006-07: PRIN2006 'Development of electrochemical micro- and nanosystems for specific and aspecific analyses in real matrices' (PI: prof. R. Seeber - RU: Unimore)
- 2002-03: PRIN2002 'Electrode systems and innovative electroanalytical methodologies for analysis in real matrices' (PI: prof. Mazzocchin - RU: Unive)
- 2001-03: Interuniversity Cooperation Project 'Promotion of a European dimension in chemist training: mobility and integrated training and research programs'. Italy: University of Modena, Pavia, Messina. Foreign partners: Polithenica University of Bucharest (Romania), University of Burgos (Spain), University of Turku (Finland), University of Leiden (The Netherlands).

- 2001: Young Researcher Program from Ministero dell'Istruzione, dell'Università e della Ricerca (MIUR) 'Synthesis of thiophene-based metal complexes and electrosynthesis of polymer films'.

TEACHING ACTIVITIES

- Teacher of the course: *Instrumental Methods in Analytical Chemistry* at the Bachelor in Chemistry, University of Modena and Reggio Emilia (from the academic years **2017/2018** onwards)
- Teacher of the course: *Laboratory of Analytical Chemistry II* at the Bachelor in Chemistry, University of Modena and Reggio Emilia (from the academic years **2017/2018** onwards)
- Teacher of the course: *Analytical Chemistry* at the Master in Pharmaceutical Chemistry and Technology, University of Modena and Reggio Emilia (from the academic years **2014/2015** onwards)
- Teacher of the course: *Analytical Chemistry* at the Master in Pharmacy, University of Modena and Reggio Emilia (from the academic years **2014/2015** to **2016/17**)
- Teacher of the course: *Laboratory of Analytical Chemistry II* at the Bachelor in Chemistry, University of Modena and Reggio Emilia (in the academic years **2016/2017**)
- Teacher of the course *Bioanalytical Chemistry and Lab* at the Master in Industrial Biotechnology, University of Modena and Reggio Emilia (in the academic years **2013/2014**)
- Teacher of the course *Controls of production processes* at the Master in Medical and Pharmaceutical Biotechnology, University of Modena and Reggio Emilia (in the academic years **2009/2010** and **2011/12**)
- Teacher of the course *Bioanalytical Chemistry* at the Master in Industrial Biotechnology, University of Modena and Reggio Emilia (in the academic years **2008/2009** to **2010/11**)
- Teacher of the course *Laboratory of Chemistry* at the Bachelor in Biotechnology, University of Modena and Reggio Emilia (in the academic years **2009/2010** and **2010/2011**)
- Teacher of the course *Laboratory of Chemistry* at the Bachelor in Biotechnology, University of Modena and Reggio Emilia (in the academic years **2009/2010** and **2010/2011**)
- Teacher of the course *Bioanalytical Chemistry* at the Bachelor in Industrial Biotechnology, University of Modena and Reggio Emilia (in the academic years **2002/2003** to **2006/07** and in **2008/2009**)
- Teacher of the course *Analytical Chemistry II* at the Master in Industrial Biotechnology, University of Modena and Reggio Emilia (in the academic years **2005/2006** to **2007/2008**)
- Teacher of the course *Food Chemistry* at the Master in Industrial Biotechnology, University of Modena and Reggio Emilia (in the academic years **2005/2006** to **2007/2008**)
- Teacher of the course *Laboratory of Analytical Chemistry* at the Bachelor in Biology, University of Modena and Reggio Emilia (in the academic years **2008/2009**)
- Teacher of the course *Laboratory of Analytical Chemistry* at the Bachelor in Biotechnology, University of Modena and Reggio Emilia (in the academic years **2002/2003** to **2006/2007** and in **2008/2009**)
- Teacher of the course *Laboratory of Analytical Chemistry I* at the Bachelor in Chemistry, University of Modena and Reggio Emilia (in the academic years in **2008/2009**)
- Teacher of the course *Applied Analytical Chemistry* at the Master in Chemistry, University of Modena and Reggio Emilia (in the academic years in **2004/2005**)
- Teacher of the course *Chemical Sensors* Master in Chemistry, University of Modena and Reggio Emilia (in the academic years in **2003/2004**)
- Teacher of the course *Laboratory of Analytical Chemistry* at the Bachelor in Chemistry, University of Modena and Reggio Emilia (in the academic years in **2002/2003** and **2003/2004**)

SUPERVISION OF PhD STUDENTS AND POSTDOCTORAL FELLOWS

- **2014-2017**. Supervisor of one Ph.D. Student, Dr. Giulio Maccaferri working on a thesis entitled 'Electrochemical sensing platforms based on graphene materials'.
- **2018-2021**. Supervisor of one Ph.D. Student, Dr. Fabrizio Poletti working on a thesis entitled 'Synthesis and characterization of novel nanostructured materials for amperometric sensors'.
- **Jul 2017-May 2019**. Supervisor of one post-doctoral fellow, Dr. F. Terzi working on a project entitled '*Amperometric sensors for process and quality control*'.
- **Jun 2019-May 2022**. Supervisor of one post-doctoral fellow, Dr. B. Zanfognini working on a project entitled '*Produzione e caratterizzazione di materiali compositi nanostrutturati a base di Grafene*' on Eu Project "Graphene Flagship".
- **Sep 2020-Aug 2021**. Supervisor of one post-doctoral fellow, Dr. L. Lancellotti working on a project entitled '*Produzione e caratterizzazione elettrica di materiali nanostrutturati a base grafene*' on Eu Project "Graphene Flagship".
- **Dec 2020-Nov 2021**. Supervisor of one junior fellow, Dr. G. Bevini working on a project entitled '*Development of an electrochemical sensor for the determination of cannabinoids in Cannabis sativa L. based products and biological fluids*' of the project FAR2019.

ACADEMIC DUTIES

- **from Nov 2015**. Responsible for international relationships of the chemistry area.
- **from Nov 2015**. Responsible of the English teachings of the Department of Chemical and Geological Sciences
- **from Feb 2020**. Member of the tutorate commission for students of Bachelor and Master in Chemistry
- **from Apr 2015**. Member of the tutorate commission for students of Master in Pharmaceutical Chemistry and Technology.
- **from 2018**. Referent of Erasmus exchanges with the University of Cadiz (Spain), of Turku (Finland), of Bucarest (Romania) and of Lincoln (UK).
- **from 2008**. Referent of Erasmus exchanges with the University of Burgos (Spain).
- **2009-2011**. Member of the tutorate commission for students of Master in Biotechnology.

AWARDS

- '*Best thesis*' Prize released by Division of Electrochemistry of the Italian Chemical Society in **2000**
- "*Young Researcher*" Prize released by Division of Analytical Chemistry of the Italian Chemical Society in **2002**
- **12/12/2014**: National Scientific Enabling (ASN) for the position of full professor in the sector Analytical Chemistry (03/A1)
- **06/09/2018**: National Scientific Enabling (ASN) for the position of full professor in the sector Analytical Chemistry (03/A1)

MEMBERSHIPS AND APPOINTMENTS

- Associate member of Istituto per la Sintesi Organica e Fotoreattività (ISOF) del Consiglio Nazionale delle Ricerche (CNR), Bologna **from 2017**
- Member of the Division of Analytical Chemistry of the Italian Chemical Society (SCI) **from 1999**.
- Member of the Interdivisional Sensors Group of the Italian Chemical Society (SCI) **from 2013**.
- Member of the International Society of Electrochemistry (ISE) **from 1999**.
- Member of the Interuniversity National Consortium for the Science and Technology of Materials (INSTM) **from 1999**.

- Member of a commission of experts in the development of innovative biosensors, Frankfurt **may 2019**
- External member of PhD programme in Nanoscience and Materials Technology at the University of Cadiz **from 2018**
- Member of the Doctorate School 'Models and Methods for Material and Environmental Sciences' of the University of Modena and Reggio Emilia (**from** the academic years **2015/2016**)
- Member of the Doctorate School Information and Communication Technology' of the University of Modena and Reggio Emilia (from the academic years **2010/2011** to **2014/2015**)
- Member of the Doctorate School 'Scienze, Tecnologie e Biotecnologie Agro-Alimentari' of the University of Modena and Reggio Emilia (from the academic years **2007/2008** to **2009/2010**)
- Members of the examination board of Chiara Diacci at the the Institute of Technology, Linköping University (SE) in **Nov 2021**
- Expert member of the PhD commission of B. R. Qader at the University of Lincoln (UK), in **June 2017**
- Member of the PhD commission in "Models and Methods for Material and Environmental Sciences" in **Apr 2017**
- Expert member of the PhD commission of Ana Cristina Fernandez Blanco at the University of Burgos (ES), in **Oct 2014**
- Member of the Board of "NewFoodLab" spin-off as the delegate for UNIMORE from **June 2014** to **dec 2018**.
- Delegate of the Analytical Chemistry Division within the Board of Gruppo Giovani' of the Italian Society of Chemistry from **2002** to **2009**

ORGANISATION OF SCIENTIFIC MEETINGS AND SCHOOLS

- Member of the Organization committee of the GS2009 Congress, Modena 17-18 Sep **2009**
- Member of the Scientific committee of the 9° SAYCS: Sigma Aldrich Young Symposium; Pesaro 12-14 October **2009**
- Member of the Scientific committee of the 8° SAYCS: Sigma Aldrich Young Symposium; Pesaro 20-21 October **2008**
- Member of the Scientific committee of the 7° SAYCS: Sigma Aldrich Young Symposium; Riccione 22-24 October **2007**
- Member of the Scientific committee of the 6° SAYCS: Sigma Aldrich Young Symposium; Riccione 9-11 October **2006**

ACTIVITIES IN REFERRED SCIENTIFIC JOURNALS.

- Co-Editor of a special issue of Sensors (MDPI) 'Recent Advance in Electrochemical Biosensors' in **Dec 2021**
- Co-Editor of a special issue of Sensors (MDPI) 'Nanostructured Surfaces in Sensing Systems' in **Dec 2018**
- Co-Editor of a special issue of Analytical and Bioanalytical Chemistry (Springer) dealing with Amperometric Sensing, (volume 405 – issue 11) in **2013**
- Co-Editor of a special issue of Sensors dealing with Amperometric Sensing in **2013**
- Member of the Section board of Sensors (from MDPI) for Biosensors **from 2019**
- Review Editor of Frontier in Chemistry, Analytical Chemistry **from 2017**
- Review Editor of Frontier in Chemistry, Electrochemistry **from 2020**
- Member of the Editorial Board of Analytica (from MDPI) **from 2020**

INVITED PRESENTATIONS

- 'Carbon-based nanomaterials in electrochemical sensing: the role of oxidized functional groups', Trends in Nanotechnology (TNT 2020), Tirana (Albania), 26-30 Oct **2021**.
- 'Role of oxidized functional groups in the electrocatalytic properties of carbon-based nanomaterials', 72nd Annual Meeting of the International Society of Electrochemistry, Jeju Island (Korea), 29 Aug - 3 Sep **2021**.
- 'Graphene-based electrodes for the detection of biomarkers in sweat', XXVII National Congress of Italian Society of Chemistry, Milano, 14-23 Sep **2021**.
- 'Carbon-based sensors for the monitoring of biomarkers in sweat', 1st International Electronic Conference on Biosensors, 2-17 Nov **2020**.
- 'Graphene-based wearable sensors for the monitoring of biomarkers in sweat'. Graphene for Research, Innovation, Collaboration (G4RIC), Strasbourg (on line congress) 22-24 Sep **2020**.
- 'Multifunctional plaster sensor for human skin, based on functionalized graphene - ChemSens'. Graphene Week, Helsinki (Finland) 23-27 Sep **2019**.
- 'Graphene oxide-based materials for electrochemical (bio)sensing'. 2nd European Conference on Chemistry of two-dimensional materials (Chem2DMat), Dresden (Germany), 03-06 Sep **2019**.
- 'Nanosized materials in electrochemical sensing'. Coffee talk @ ISOF, Bologna (Italy), 12 Mar **2019**.
- 'Nanostructured surface coatings in electrochemical sensing', 1st National School on Chemical Sensors, Naples (Italy) 24-26 May **2017**
- 'Electrocatalytic coatings in amperometric sensing: advantages and criticisms', Keynote of the XXV Congress of Analytical Chemistry, Trieste (Italy) 13-17 Sep **2015**
- 'Electrochemical Sensors and Biosensors', National School of Analytical Chemistry for PhD students, Rome 22-26 Sep **2014**
- 'Conducting Polymers: synthesis and applications as sensors in electrochemistry', University of Burgos (Spagna), Feb **2007**
- "Au nanoparticles in electroanalysis", Keynote of GS2010, Florence (Italy), Oct **2010**

OTHER INFORMATION

BIBLIOMETRIC INDICATORS AND SCIENTIFIC PRODUCTION

Total number of publications in scientific journals with IF: 88

Total number of book chapters: 2

Total number of books: 1

Total number of citations: 1663 (Scopus)

h-index: 25 (Scopus)

LIST OF SCIENTIFIC PUBLICATIONS ON INTERNATIONAL JOURNALS WITH IF.

1. B. Ballarin, R. Seeber, D. Tonelli, **C. Zanardi**
Anionic clay modified electrode for the detection of alcohols. An electrocatalytic amperometric sensor.
Electroanalysis, **2000**, 12 (6), 434-441.
2. H. Ding, L. Pigani, R. Seeber, **C. Zanardi**
p- and n- doping of electrochemically formed poly(4,4'-bisbutylsulfanyl-2,2'-bithiophene). A novel material with reduced bandgap.
Journal of New Materials for Electrochemical Systems, **2000**, 3 (4), 337-341.
3. M. Cocchi, A. Marchetti, L. Pigani, G. Sanna, L. Tassi, A. Ulrici, G. Vaccari, **C. Zanardi**
Density and volumetric properties of ethane-1,2-diol + di-ethylen-glycol mixtures at different temperatures.
Fluid Phase Equilibria, **2000**, 172 (1), 93-104.

4. B. Ballarin, F. Costanzo, F. Mori, A. Mucci, L. Pigani, L. Schenetti, R. Seeber, D. Tonelli, **C. Zanardi**
Electropolymerization and characterization of poly[4,4'-bis(butylsulphanil)-2,2'-bithiophene].
Electrochimica Acta, **2001**, 46 (17), 881-889.
5. D. Iarossi, A. Mucci, F. Parenti, L. Schenetti, R. Seeber, **C. Zanardi**, A. Forni, M. Tonelli
Synthesis and spectroscopic and electrochemical characterization of a conducting polythiophene bearing a chiral substituent: Polymerization of (+)-4,4'-bis(2-methylbutylsulfanyl)-2,2'-bithiophene.
Chemistry a European Journal, **2001**, 7 (3), 676-685.
6. A. Mucci, F. Parenti, L. Schenetti, **C. Zanardi**
 β -Functionalized α,α' -conjugated oligothiophenes with alkylsulfanyl groups: synthesis and characterization.
Trends in Heterocyclic Chemistry, **2001**, 7, 55-64.
7. M. Cocchi, A. Marchetti, L. Pigani, L. Tassi, A. Ulrici, G. Vaccari, **C. Zanardi**
Densities and Volume Properties of the 2-Methoxyethanol + 1,2-Dimethoxyethane + Water Ternary Solvent System at Various Temperatures.
Physics and Chemistry of Liquids, **2001**, 39 (2), 151-168.
8. H. Ding, Z. Pan, L. Pigani, R. Seeber, **C. Zanardi**
p- and n- doping processes in polythiophenes with reduced bandgap. An electrochemical impedance spectroscopy study.
Electrochimica Acta, **2001**, 46 (17), 2721-2732.
9. S. Lupu, A. Mucci, L. Pigani, R. Seeber, **C. Zanardi**
Polythiophene Derivative Conducting Polymer Modified Electrodes and Microelectrodes for Determination of Ascorbic Acid. Effect of Possible Interferents.
Electroanalysis, **2002**, 14 (7-8), 519-525.
10. M. Cocchi, G. Franchini, M. Manfredini, A. Marchetti, L. Pigani, R. Seeber, L. Tassi, A. Ulrici, M. Vignali, C. Zanardi, P. Zannini
 β -functionalised polythiophenes as microelectrode modifiers in low conductive media.
Annali di Chimica, **2002**, 92 (3), 177-185.
11. M. Cocchi, M. Manfredini, A. Marchetti, L. Pigani, R. Seeber, L. Tassi, A. Ulrici, M. Vignali, **C. Zanardi**, P. Zannini
Temperature and composition dependence of refractive indices of the 2-chloroethanol + 2-methoxyethanol binary mixtures.
Annali di Chimica, **2002**, 92 (3), 187-201.
12. S. Lupu, C. Mihailciuc, L. Pigani, R. Seeber, N. Totir, **C. Zanardi**
Electrochemical preparation and characterisation of bilayer films composed by Prussian Blue and conducting polymer.
Electrochemistry Communications, **2002**, 4 (10), 753-758.
13. M. Cocchi, M. Manfredini, A. Marchetti, L. Pigani, R. Seeber, L. Tassi, A. Ulrici, **C. Zanardi**
Viscosity of (ethane-1,2-diol + 1,2-dimethoxyethane + water) at temperatures from 263.15 K to 353.15 K.
Journal of Chemical Thermodynamics, **2002**, 34 (5), 593-611.

14. S. Lupu, F. Parenti, L. Pigani, R. Seeber, **C. Zanardi**
Differential pulse techniques on modified conventional-size and microelectrodes. Electroactivity of poly[4,4'-bis(butylsulfanyl)-2,2'-bithiophene] coating towards dopamine and ascorbic acid oxidation.
Electroanalysis, **2003**, 15 (8), 715-725.
15. A. Mucci, F. Parenti, L. Pigani, R. Seeber, **C. Zanardi**, M. I. Pilo, N. Spano, M. Manassero
The effect of Pd(II) coordination on the properties of an alkylsulphanyl substituted polythiophene. Comparison with the corresponding monomer
Journal of Materials Chemistry, **2003**, 13 (6), 1287-1292.
16. B. Ballarin, **C. Zanardi**, L. Schenetti, R. Seeber, J. L. Hidalgo Hidalgo de Cisneros
Synthesis and electrochemical characterisation of novel sonogel-carbon-polythiophene microstructured electrodes
Synthetic Metals, **2003**, 139 (1), 29-33.
17. B. Ballarin, M. Facchini, M. Lanzi, L. Paganin, **C. Zanardi**
Electrochemical synthesis and spectroscopic studies of polyalkylthiophene bearing NLO chromophoric units
Journal of Electroanalytical Chemistry, **2003**, 553, 97-106.
18. A. Alberti, B. Ballarin, M. Guerra, D. Macciantelli, A. Mucci, F. Parenti, L. Schenetti, R. Seeber, **C. Zanardi**
Radical Ions from 3,3',3''-tris(butylsulfanyl)-2,2':5',2'':5'',2''':5''',2''':5''''-sexithiophene: an experimental and theoretical study of the p- and n-doped oligomer
ChemPhysChem, **2003**, 4 (11), 1216-1225.
19. L. Pigani, R. Seeber, F. Terzi, **C. Zanardi**
Influence of the nature of the supporting electrolyte on the formation of poly[4,4'-bis(butylsulphanyl)-2,2'-bithiophene] films. A role for both counter-ion and co-ion in the polymer growth and p-doping processes
Journal of Electroanalytical Chemistry, **2004**, 562 (2), 231-239.
20. L. Pigani, R. Seeber, F. Terzi, **C. Zanardi**
EQCM study of the p- and n-doping processes of a poly[4,4'-bis(alkylsulphanyl)-2,2'-bithiophene]
Journal of Electroanalytical Chemistry, **2004**, 570 (2), 235-242.
21. M. Cocchi, G.C. Franchini, A. Marchetti, L. Pigani, R. Seeber, L. Tassi, A. Ulrici, **C. Zanardi**, P. Zannini
A study of the dielectric behavior and the liquid structure of a ternary solvent system.
Annali di Chimica, **2004**, 94 (3), 165-176.
22. L. Zobbi, M. Mannini, M. Pacchioni, G. Chastanet, D. Bonacchi, **C. Zanardi**, R. Biagi, U. Del Pennino, D. Gatteschi, A. Cornia, R. Sessoli
Isolated Single-Molecule Magnets on native gold.
Chemical Communications, **2005**, (12), 1640-1642.
23. F. Terzi, R. Seeber, L. Pigani, **C. Zanardi**, L. Pasquali, S. Nannarone, M. Fabrizio, S. Daolio
3-methylthiophene Self Assembled Monolayers on planar and nanoparticle Au surfaces.
Journal of Physical Chemistry B, **2005**, 109 (41), 19397- 19402.
24. S. Lupu, L. Pigani, R. Seeber, F. Terzi, **C. Zanardi**
Study of ultrathin Prussian Blue films using *in situ* electrochemical surface plasmon resonance.
Collection of Czechoslovak Chemical Communications, **2005**, 70 (2), 154-167.

25. M. A. Heras, S. Lupu, L. Pigani, C. Pirvu, R. Seeber, F. Terzi, **C. Zanardi**
A poly(3,4-ethylenedioxythiophene)-poly(styrene sulphonate) composite electrode coating in the electrooxidation of phenol.
Electrochimica Acta, **2005**, 50 (7-8), 1685-1691.
26. L. Antolini, G. Minghetti, A. Mucci, F. Parenti, L. Pigani, G. Sanna, R. Seeber, **C. Zanardi**
Palladium(II) derivatives of alkylsulphanyl substituted thiophenes as precursors of inorganic polymers: spectroscopic, electrochemical investigations and X-ray crystal structure of trans-PdCl₂[3-(butylsulfanyl)thiophene]₂.
Inorganica Chimica Acta, **2005**, 358 (11), 3033-3040.
27. **C. Zanardi**, R. Scanu, L. Pigani, M. I. Pilo, G. Sanna, R. Seeber, N. Spano, F. Terzi, A. Zucca
Synthesis and electrochemical polymerisation of 3'-functionalised terthiophenes. Electrochemical and spectroelectrochemical characterisation.
Electrochimica Acta, **2006**, 51 (23), 4859-4864.
28. **C. Zanardi**, R. Scanu, L. Pigani, M. I. Pilo, G. Sanna, R. Seeber, N. Spano, F. Terzi, A. Zucca
Electrochemical and spectroelectrochemical characterisation of poly(3'-hydroxymethyl-2,2':5',2''-terthiophene).
Synthetic Metals, **2006**, 156 (14-15), 984-989.
29. L. Pigani, M. Musiani, C. Pirvu, F. Terzi, **C. Zanardi**, R. Seeber
Electro-oxidation of chlorophenols on poly(3,4-ethylenedioxythiophene)-poly(styrene sulphonate) composite electrode
Electrochimica Acta, **2007**, 52 (5), 1910-1918.
30. L. Pasquali, F. Terzi, **C. Zanardi**, L. Pigani, R. Seeber, G. Paolicelli, S.M. Sutarin, N. Mahne, S. Nannarone
Structure and properties of 1,4-benzenedimethanethiol films grown from solution on Au(111): an XPS and NEXAFS study
Surface Science, **2007**, 601 (5), 1419-1427.
31. V. Martina, K. Ionescu, L. Pigani, F. Terzi, A. Ulrici, **C. Zanardi**, R. Seeber
Development of an electronic tongue based on a PEDOT-modified voltammetric sensor
Analytical and Bioanalytical Chemistry, **2007**, 387 (6), 2101-2110.
32. L. Pasquali, F. Terzi, **C. Zanardi**, R. Seeber, G. Paolicelli, N. Mahne, S. Nannarone
Bonding and orientation of 1,4-benzenedimethanethiol on Au(111) prepared from solution and from gas phase
Journal of Physics - Condensed Matter, **2007**, 19 (30), 305020.
33. A. Bello, M. Giannetto, G. Mori, R. Seeber, F. Terzi, **C. Zanardi**
Optimization of the DPV potential waveform for determination of ascorbic acid on PEDOT-modified electrodes.
Sensors and Actuators B – Chemical, **2007**, 121 (2), 430-435.
34. F. Terzi, **C. Zanardi**, V. Martina, L. Pigani, R. Seeber
Electrochemical, spectroscopic and microscopic characterisation of novel poly(3,4-ethylenedioxythiophene)/gold nanoparticles composite materials.
Journal of Electroanalytical Chemistry, **2008**, 619-620, 75-82
(correction: *Journal of Electroanalytical Chemistry*, **2009**, 635, 120)

35. L. Pigani, G. Foca, K. Ionescu, V. Martina, A. Ulrici, F. Terzi, M. Vignali, **C. Zanardi**, R. Seeber
Amperometric sensors based on poly(3,4-ethylenedioxythiophene)-modified electrodes: discrimination of white wines.
Analytica Chimica Acta, **2008**, 614 (2), 213-222.
36. **C. Zanardi**, F. Terzi, L. Pigani, A. Heras, A. Colina, J. Lopez-Palacios, R. Seeber
Development and characterisation of a novel composite electrode material consisting of poly(3,4-ethylenedioxythiophene) including Au nanoparticles.
Electrochimica Acta, **2008**, 53 (11), 3916-3923.
37. L. Pigani, G. Foca, A. Ulrici, K. Ionescu, V. Martina, F. Terzi, M. Vignali, **C. Zanardi**, R. Seeber
Classification of red wines by chemometric analysis of voltammetric signals from PEDOT-modified electrodes.
Analytica Chimica Acta, **2009**, 643 (1-2), 67-73.
38. F. Terzi, **C. Zanardi**, B. Zanghognini, L. Pigani, R. Seeber, J. Lukkari, T. Ääritalo, J. Kankare
Preparation and characterisation of a redox multilayer film containing Au nanoparticles.
Journal of Physical Chemistry C, **2009**, 113 (12), 4868-4874.
39. **C. Zanardi**, F. Terzi, B. Zanghognini, L. Pigani, R. Seeber, J. Lukkari, T. Ääritalo
Effective catalytic electrode system based on polyviologen and Au nanoparticles multilayer.
Sensors and Actuators B – Chemical, **2010**, 144 (1), 92-98.
40. **C. Zanardi**, F. Terzi, R. Seeber
Composite electrode coatings in amperometric sensors. Effects of differently encapsulated gold nanoparticles in poly(3,4-ethylenedioxythiophene) system.
Sensors and Actuators B, **2010**, 148, 277-282.
41. M. Giannetto, G. Mori, F. Terzi, **C. Zanardi**, R. Seeber,
Composite PEDOT/Au nanoparticles modified electrodes for determination of mercury at trace levels by anodic stripping voltammetry.
Electroanalysis, **2011**, 23, 456-464.
42. F. Terzi, B. Zanghognini, **C. Zanardi**, L. Pigani, R. Seeber
Poly(3,4-ethylenedioxythiophene)/Au-nanoparticles composite as electrode coating suitable for electrocatalytic oxidation.
Electrochimica Acta, **2011**, 56, 3575-3579.
43. F. Terzi, **C. Zanardi**, S. Daolio, M. Fabrizio, R. Seeber
Au/Pt nanoparticle systems in methanol and carbon monoxide electrooxidation.
Electrochimica Acta, **2011**, 56, 3673-3678.
44. P. Manca, M. I. Pilo, G. Casu, S. Gladiali, G. Sanna, R. Scanu, N. Spano, A. Zucca, **C. Zanardi**, D. Bagnis, L. Valentini
Terpyridine tethered polythiophenes: expanding the electronic delocalization through an ethynyl spacer
Journal of Polymer Science A, **2011**, 49, 3513-3523.
45. B. Zanghognini, **C. Zanardi**, F. Terzi, T. Aaritalo, A. Viinikanoja, J. Lukkari, R. Seeber
Layer by layer deposition of a polythiophene / Au nanoparticles multilayer with effective electrochemical properties
Journal of Solid State Electrochemistry, **2011**, 15, 2395-2400.

46. B. Zanafrognini, A. Colina, A. Heras, **C. Zanardi**, R. Seeber, J. López-Palacios
UV-Visible/Raman Spectroelectrochemical study of poly(3,4-ethylenedioxythiophene) films stability
Polymer Degradation and Stability, **2011**, 96, 2112-2119.
47. F. Terzi, B. Zanafrognini, **C. Zanardi**, L. Pigani, R. Seeber
Electroreduction of chloramines through novel electrode materials
Electroanalysis, **2012**, 24, 833-841.
48. **C. Zanardi**, F. Terzi, R. Seeber, C. Baldoli, E. Licandro, S. Maiorana
Development of a gold nanostructured surface for amperometric genosensors
Artificial DNA, PNA & XNA, **2012**, 3, 80-87.
49. **C. Zanardi**, C. Baldoli, E. Licandro, F. Terzi, R. Seeber
Development of a gold nanostructured surface for amperometric genosensors
Journal of Nanoparticle Research, **2012**, 14, 1148-1159.
50. **C. Zanardi**, F. Terzi, R. Seeber
Polythiophenes and polythiophene-based composites in amperometric sensing
Analytical and Bioanalytical Chemistry, **2013**, 405, 509-531 – *contributo ad invito*.
51. R. Scanu, P. Manca, A. Zucca, G. Sanna, N. Spano, R. Seeber, **C. Zanardi**, M. I. Pilo
Homoleptic Ru(II) complex with terpyridine ligands appended with terthiophene moieties. Synthesis, characterization and electropolymerization
Polyhedron, **2013**, 49, 24-28.
52. F. Terzi, J. Pelliciari, **C. Zanardi**, L. Pigani, A. Viinikanoja, J. Lukkari, R. Seeber
Graphene-modified electrode. Determination of hydrogen peroxide at high concentrations
Analytical and Bioanalytical Chemistry, **2013**, 405, 3587-3592.
53. **C. Zanardi**, L. Ferrari, B. Zanafrognini, L. Pigani, F. Terzi, S. Cattini, L. Rovati, R. Seeber
Development of a sensor system for the determination of sanitary quality of grapes
Sensors, **2013**, 13, 4571-4580.
54. F. Terzi, J. Pelliciari, B. Zanafrognini, L. Pigani, **C. Zanardi**, R. Seeber
Behaviour of Ti electrode in the amperometric determination of high concentrations of strong oxidising species.
Electrochemistry Communications, **2013**, 34, 138-141.
55. J. R. Crespo-Rosa, **C. Zanardi**, M. ElKaoutit, F. Terzi, R. Seeber, I. Naranjo-Rodriguez
Electroanalytical applications of a graphite–Au nanoparticles composite included in a sonogel matrix.
Electrochimica Acta, **2014**, 122, 310-315.
56. F. Terzi, B. Zanafrognini, S. Ruggeri, G. Maccaferri, L. Pigani, **C. Zanardi**, R. Seeber
Ti metal electrode as an unconventional amperometric sensor for determination of Au(III) species
Analytical and Bioanalytical Chemistry, **2015**, 407, 983-990.
57. F. Arduini, **C. Zanardi**, S. Cinti, F. Terzi, D. Moscone, G. Palleschi, R. Seeber
Effective electrochemical sensor based on screen-printed electrodes modified with a carbon black - Au nanoparticles composite.
Sensors and Actuators B, **2015**, 212, 536-543.
58. R. Seeber, L. Pigani, F. Terzi, **C. Zanardi**
Amperometric sensing. A melting pot for material, electrochemical, and analytical sciences
Electrochimica Acta, **2015**, 179, 350-363.

59. **C. Zanardi**, E. Ferrari, L. Pigani, F. Arduini, R. Seeber
Development of an electrochemical sensor for NADH determination based on caffeic acid redox mediator supported on carbon black
Chemosensors, **2015**, 3, 118-128.
60. R. Seeber, **C. Zanardi**, G. Inzelt
Links between electrochemical thermodynamics and kinetics
ChemTexts, **2015**, 1, article 18
61. **C. Zanardi**, L. Pigani, G. Maccaferri, M. Degli Esposti, P. Fabbri, P. Zannini, R. Seeber
Development of a redox polymer based on poly(2-hydroxyethyl methacrylate) for disposable amperometric sensors
Electrochemistry Communications, **2016**, 62, 34-37
62. S. Asir, **C. Zanardi**, R. Seeber, H. Icil
A novel unsymmetrically substituted chiral amphiphilic perylene diimide: Synthesis, photophysical and electrochemical properties both in solution and solid state
Journal of Photochemistry and Photobiology A: Chemistry, **2016**, 318, 104–113
63. R. Seeber, **C. Zanardi**, G. Inzelt
The inherent coupling of charge transfer and mass transport processes: the curious electrochemical reversibility
ChemTexts, **2016**, 2, article 8
64. L. Pigani, C. Rioli, G. Foca, A. Ulrici, R. Seeber, F. Terzi, **C. Zanardi**
Determination of polyphenol content and colour index in wines through PEDOT modified electrodes
Analytical and Bioanalytical Chemistry, **2016**, 408, 7329-7338.
65. M. Zambianchi, E. Benvenuti, C. Bettini, **C. Zanardi**, R. Seeber, D. Gentili, M. Cavallini, M. Muccini, V. Biondo, C. Soldano, G. Generali, S. Toffanin, M. Melucci
Anthracene-based molecular emitters for non-doped deep-blue organic light emitting transistors
Journal of Materials Chemistry C, **2016**, 4, 9411-9417.
66. J. M. Palacios-Santander, F. Terzi, **C. Zanardi**, L. Pigani, L.M. Cubillana-Aguilera, I. Naranjo-Rodriguez, R. Seeber
Electrocatalytic and antifouling properties of CeO₂-glassy carbon electrodes
Journal of Solid State Electrochemistry, **2016**, 11, 3125-3131.
67. S. Ruggeri, F. Terzi, B. Zangognini, E. Corsi, N. Dossi, **C. Zanardi**, L. Pigani, R. Seeber
Electroanalytical determination of soluble Mn(II) species at high concentration levels
Electrochimica Acta, **2017**, 240, 108–113
68. G. Maccaferri, **C. Zanardi**, Z. Y. Xia, A. Kovtun, A. Liscio, F. Terzi, V. Palermo, R. Seeber
Systematic study of the correlation between surface chemistry, conductivity and electrocatalytic properties of graphene oxide nanosheets
Carbon, **2017**, 120, 165-175
69. L. Favaretto, M. Zambianchi, S. G. Lopez, A. Mazzanti, **C. Zanardi**, R. Seeber, D. Gentili, F. Valle, E. Benvenuti, M. Muccini, G. Ruani, F. Mercuri, S. Milita, F. Liscio, M. Cavallini, S. Toffanin, M. Melucci
Synthesis and investigation on processing-depending polarized fluorescence emission in thin-films of 2,2'-([2,2'-bithiophene]-5,5'-diyl)bis(5-octyl-4-phenyl-4*H*-thieno[2,3-*c*]pyrrol-6(5*H*)-one)
Journal of Materials Chemistry C, **2017**, 5, 10320-10331.

70. **C. Zanardi**, B. Zanafrognini, S. Morandi, F. Terzi, L. Pigani, L. Pasquali, R. Seeber
Synthesis, spectroscopic and electrochemical characterization of Co(II)-terpyridine based metallopolymer
Electrochimica Acta, **2018**, 60, 314-323
71. S. Ruggeri, E. Miles, F. Poletti, L. Pigani, **C. Zanardi**, B. Zanafrognini, E. Corsi, N. Dossi, R. Seeber, F. Terzi
Voltammetric behaviour of Cu alloys toward hydrogen peroxide and organic species
Electrochemistry Communications, **2018**, 90, 56–60
72. S. Ruggeri, F. Poletti, **C. Zanardi**, L. Pigani, B. Zanafrognini, E. Corsi, N. Dossi, M. Salomaki, H. Kivela, J. Lukkari, F. Terzi
Chemical and electrochemical properties of a hydrophobic deep eutectic solvent
Electrochimica Acta, **2019**, 295, 124-129
73. G. Maccaferri, F. Terzi, Z. Xia, F. Vulcano, A. Liscio, V. Palermo, **C. Zanardi**
Highly sensitive amperometric sensor for morphine detection based on electrochemically exfoliated graphene oxide. Application in screening tests of urine samples
Sensors and Actuator B, **2019**, 281, 739–745
74. A. Heras, F. Vulcano, J. Garoz-Ruiz, N. Porcelli, F. Terzi, A. Colina, R. Seeber, **C. Zanardi**
A flexible platform of electrochemically functionalized carbon nanotubes for NADH sensors
Sensors, **2019**, 19, 518-529.
75. Z. Xia, G. Maccaferri, **C. Zanardi**, M. Christian, L. Ortolani, V. Morandi, V. Bellani, A. Kovtun, S. Dell’Elce, A. Candini, V. Palermo
Dispersion stability and surface morphology study of electrochemically exfoliated bilayer graphene oxide
Journal of Physical Chemistry C, **2019**, 123, 15122-15130.
76. M. L. Ligabue, F. Terzi, **C. Zanardi**, G. Lusvardi
One-pot sonocatalyzed synthesis of sol–gel graphite electrodes containing gold nanoparticles for application in amperometric sensing
Journal of Materials Science, **2019**, 54, 9553-9564
77. F. Terzi, L. Pigani, **C. Zanardi**
Unusual metals as electrode materials for electrochemical sensors
Current Opinion in Electrochemistry, **2019**, 16, 157-163.
78. D. Bottari, L. Pigani, **C. Zanardi**, F. Terzi, S. V. Pațurcă, S. D. Grigorescu, C. Matei, C. Lete, S. Lupu
Electrochemical sensing of caffeic acid using gold nanoparticles embedded in poly(3,4-ethylenedioxythiophene) layer by sinusoidal voltage procedure.
Chemosensors, **2019**, 7, 65-78.
79. F. Poletti, L. Favaretto, A. Kovtun, E. Treossi, F. Corticelli, M. Gazzano, V. Palermo, **C. Zanardi**, M. Melucci
Electrochemical sensing of glucose by chitosan modified graphene oxide
Journal of Physics: Materials, **2020**, 3, 014011
80. F. Vulcano, A. Kovtun, C. Bettini, Z. Xia, A. Liscio, F. Terzi, A. Heras, A. Colina, B. Zanafrognini, M. Melucci, V. Palermo, **C. Zanardi**
Dopamine-functionalized graphene oxide as a high-performance material for biosensing
2D Materials, **2020**, 7, 024007

81. C. Bartolucci, A. Antonacci, F. Arduini, D. Moscone, L. Fraceto, E. Campos, R. Attaallah, A. Amine, **C. Zanardi**, L. M. Cubillana-Aguilera, J. M. Palacios Santander, V. Scognamiglio
Green nanomaterials fostering agrifood sustainability
Trends in Analytical Chemistry, **2020**, 125, 115840
82. B. Zanfognini, L. Pigani, **C. Zanardi**
Recent advances in the direct electrochemical detection of drugs of abuse
Journal of Solid State Electrochemistry, **2020**, 24, 2603–2616.
83. L. Pigani, C. Rioli, D. López-Iglesias, **C. Zanardi**, B. Zanfognini, L. M. Cubillana-Aguilera, J. M. Palacios-Santander
Preparation and characterization of reusable Sonogel-Carbon electrodes containing carbon black: Application as amperometric sensors for determination of catechol
Journal of Electroanalytical Chemistry, **2020**, 877, art n. 114653
84. D. López-Iglesias, J. J. García-Guzmán, **C. Zanardi**, J. M. Palacios-Santander, L. Cubillana-Aguilera, L. Pigani.
Fast electroanalytical determination of Cannabidiol and Cannabinol in aqueous solution using Sonogel-Carbon-PEDOT devices
Journal of Electroanalytical Chemistry, **2020**, 878, 114591
85. V. Brighenti, M. Protti, L. Anceschi, **C. Zanardi**, L. Mercolini, F. Pellati
Emerging challenges in the extraction, analysis and bioanalysis of cannabidiol and related compounds.
Journal of Pharmaceutical and Biomedical Analysis, **2021**, 192, 113633
86. M. Cirrincione, B. Zanfognini, L. Pigani, M. Protti, L. Mercolini, **C. Zanardi**
Development of an electrochemical sensor based on carbon black for the detection of cannabidiol in vegetable extracts
Analyst, **2021**, 146, 612–619.
87. J. R. Crespo-Rosa, G. Foca, A. Ulrici, L. Pigani, B. Zanfognini, L. Cubillana-Aguilera, J. M. Palacios-Santander, **C. Zanardi**
Simultaneous detection of glucose and fructose in synthetic musts by multivariate analysis of silica-based amperometric sensor signals
Sensors, **2021**, 20, 4190.
88. F. Poletti, B. Zanfognini, L. Favaretto, V. Quintano, J. Sun, E. Treossi, M. Melucci, V. Palermo, **C. Zanardi**
Continuous capillary-flow sensing of glucose and lactate in sweat with an electrochemical sensor based on functionalized graphene oxide
Sensors and Actuators B, **2021**, 344, 130253.

BOOK CHAPTERS

1. **C. Zanardi**, F. Terzi, L. Pigani, R. Seeber
Electrode coatings consisting of polythiophene-based composites containing metal centres.
Book chapter in: M. Lechkov, S. Prandzheva (Eds.), *Encyclopedia of Polymer Composites: Properties, Performance and Applications*
Nova Publishers, NY, **2009**, 1-74
ISBN: 978-1-60741-717-0

2. F. Terzi, **C. Zanardi**
Nanosized materials in amperometric sensors
Book chapter in: L. Moretto and K. Kalcher (Eds.)
Environmental analysis with electrochemical sensors and biosensors.
Volume 1: Fundamentals.
Chapter 17
Springer, New York, 2015, pp. 497-528.
ISBN: 978-1-4939-0675-8

BOOK

1. R. Seeber, F. Terzi, **C. Zanardi**
Functional materials in amperometric sensing. Polymeric, Inorganic, and Nanocomposite Materials for Modified Electrodes
Series: Monographs in Electrochemistry
Editor: Fritz Scholz
Springer, New York, 2014.
ISBN 978-3-662-45102-1

PROCEEDINGS OF CONGRESSES WITH ISBN

1. L. Pigani, **C. Zanardi**, R. Seeber, F. Terzi, B. Zangfronini
Development of Nanostructured Electrode Coatings for Amperometric Sensors
1° National Sensors Conference; Roma; 15-17 Feb 2012
2. F. Terzi, B. Zangfronini, L. Pigani, **C. Zanardi**, R. Seeber
Amperometric Determination of Strong Oxidising Species Through Titanium Electrode Systems
Lecture notes in Electrical Engineering - 268 LNEE, pp. 77-81
17th National Conference on Sensors and Microsystems; Brescia; Italy; 5-7 Feb 2013
3. **C. Zanardi**, L. Pigani, R. Seeber, F. Terzi, F. Arduini, S. Cinti, D. Moscone, G. Palleschi
Carbon black / Gold nanoparticles composite for efficient amperometric sensors.
2° National Sensors Conference; Rome; Italy; 5-7 Feb 2014
4. F. Terzi, L. Pigani, **C. Zanardi**, B. Zangfronini, S. Ruggeri, G. Maccaferri, R. Seeber
Novel electrode systems for amperometric sensing. The case of titanium
Proc. of SPIE, 2014, vol. 9253, 925313 doi: 10.1117/12.2073843
SPIE's 21st Remote Sensing Europe meeting; Amsterdam, Netherlands, 22-25 september 2014

EDITORIALS

1. R. Seeber, W. Schuhmann, F. Terzi, **C. Zanardi**, N. Plumere, M. Gebala
Amperometric sensing – Bioelectroanalysis
Analytical and Bioanalytical Chemistry – **2013**, 405, 3423-3426